Massachusetts: Barnes Aquifer - Regional Solutions Protect Large Sole Source Aquifer

Background

The Barnes Aquifer is widely recognized as one of Massachusetts' most important regional groundwater supplies. The aquifer is over 12 miles long, and is either the sole or primary water source for three municipalities within the Connecticut Valley of western Massachusetts, including the City of Westfield as well as the towns of Easthampton and Southampton. Several private residential wells tap the aquifer in the City of Holyoke, however, the City closed its municipal well due to trichloroethylene contamination (TCE). The aquifer is composed of well-sorted, coarse sands and gravels that were deposited approximately 14,000 years ago by a retreating continental glacier.

This region in the heart of western Massachusetts is known as the "Crossroads of New England" because of its strategic position along the Connecticut River and its excellent transportation facilities. While they share an important common resource, the four communities of the Barnes Aquifer, including Holyoke, have their own unique characteristics. The City of Holyoke is known for its paper mills, which at one time produced the greatest tonnage of paper of any city in the world. The City of Westfield provides a pleasing small city atmosphere to its 38,000 residents, despite having the second largest land area in the Commonwealth (covering 30,000 acres). The Town of Easthampton is a residential and manufacturing community covering roughly 13.6 square miles of land; twenty manufacturing firms create 46% of the jobs in the community. The Town of Southampton started out as a farming community and has retained much of that atmosphere through the years, although there are few farms remaining today.

Currently, 12 municipal wells and a large (108 unit) well field tap the Barnes Aquifer to supply 21 million gallons of water per day to the 60,000 residents of these communities. The aquifer's recharge area is under heavy development pressure from large-scale residential subdivisions and industrial parks. Potential sources of contamination to the aquifer are underground storage tanks, businesses which use hazardous materials and generate hazardous waste, linear sources (sewer, power, roads), defoliants (which are used to clear rights-of-way for power lines), road salting, agricultural chemicals, houses and businesses with private septic systems, and the improper storage or disposal of solvents which are used to clean equipment. In the past twenty years, various wells in the Barnes aquifer have been contaminated due to traces of ethylene dibromide (EDB) and trichloroethylene (TCE).

Priority Contamination Threats

Underground storage tanks, hazardous materials and waste, linear sources (sewer, power, roads), defoliants, road salting, agricultural chemicals, private septic systems, and the solvents are the priority contamination threats to Barnes Aquifer.

Local Involvement and Developing the Protection Plan

The size, importance, and inter-municipal geography of the Barnes Aquifer demands regional cooperation and regional solutions to protect this critical water supply.

Recognizing this, the Pioneer Valley Planning Commission (PVPC) and municipal officials from Easthampton, Holyoke, Southampton, and Westfield convened an initial meeting in March of 1988 to discuss cooperative strategies for protecting the Barnes Aquifer. Out of this meeting grew the idea for creating the Barnes Aquifer Protection Advisory Committee (BAPAC) to develop and implement a regional aquifer protection strategy. In December of 1989, the chief officials of the Cities of Westfield and Holyoke, the Towns of Easthampton and Southampton, and the PVPC signed the "Memorandum of Agreement for Barnes Aquifer Protection" at a public ceremony. This inter-governmental compact gave BAPAC the authority to review and comment on Developments of Regional Impact (DRI) in the aquifer recharge area, as well as the authority to develop and implement a regional aquifer protection strategy.

The inter-municipal compact dictates that BAPAC be comprised of representatives of the four communities (Westfield, Holyoke, Easthampton and Southampton) and the PVPC. Each of the four communities are represented by three people who are appointed by the chief elected official. These municipal members currently represent water, planning, conservation, and community development departments. PVPC also designates one staff representative for the committee. Funding for BAPAC activities comes from a small annual assessment from each member community and various grant sources for specific projects.

Management Measures

BAPAC's strategy for regional aquifer protection has three main components: education and outreach, land use planning, and water quality assessment.

Education and Outreach

BAPAC members discuss aquifer protection information at various community forums and meetings, respond to questions and requests for information, and facilitate the distribution of educational materials to the public. Accomplishments in this category include:

- Developing a Barnes Aquifer web page with information about the Barnes Aquifer and links to ground water Best Management Practices http://www.pvpc.org/bapac/index.html ;
- Publishing Best Management Practices to Protect Groundwater, Information for Small Businesses, March 1999, and an educational poster for groundwater protection strategies, funded by the Massachusetts Environmental Trust. The manual and posters were distributed to small businesses within the aquifer, and can be obtained through the PVPC;
- Distributing Green Business Awards to recognize the efforts of local companies to make their business practices more "aquifer friendly". This award is an opportunity for publicity and to educate the public on ways in which people can protect the aquifer;
- Developing a "press kit" for the water department staff of the four municipalities, to provide them with guidance and tools (such as sample press releases) for promoting BAPAC in the media;
- Creating a large wall-size poster on protecting water supplies with funding from the Massachusetts Environmental Trust, that was distributed for display to BAPAC member communities; and

- Collaborating with area teachers to develop short school programs on the Barnes Aquifer, and to promote Drinking Water Week.

Land Use Planning To preserve the ground water resources of the towns from adverse impacts of development that might reduce the quality and quantity of water, BAPAC (with technical assistance from PVPC) drafted a model Aquifer Protection Bylaw based on recommendations by the Massachusetts Department of Environmental Protection. The regulation establishes an aquifer protection district, specifies permitted and prohibited uses within the district, establishes performance standards, and states procedures for issuance of special permits and non-conforming uses. Using this model ordinance, each of the four communities have either adopted a similar bylaw or woven similar regulations through existing bylaws.

Another land use planning tool used by BAPAC for source water protection is the review of Developments of Regional Impact (DRI). The Pioneer Valley Planning Commission defines a DRI as any development project which requires: a) state approval under the MEPA process, or b) local approval for a Special Permit, Site Plan Approval, Subdivision Approval, zoning amendment, or withdrawal of property from M.G.L. Chapters 61, 61A, or 61B. In its reviews, BAPAC assesses the potential for water pollution or other adverse impacts to the aquifer from the proposed project and recommends mitigating measures to prevent such impacts. BAPAC considers each DRI review as an opportunity to educate municipalities and developers about aquifer protection, and publishes its DRI comments in its annual report.

Water Quality Assessment
BAPAC, in partnership with Smith College Geology Department, is engaged in a road salt impact study on private residential wells in Westfield and Southampton. This study involved three rounds of sampling private wells and coordination with local and state highway officials about road salt reduction. BAPAC has produced a draft road salt policy for consideration by member communities, and plans to sponsor a seminar that will advocate road salt alternatives.

With funding from Massachusetts Environmental Trust, BAPAC conducted a water quality study of the aquifer in conjunction with Smith College Department of Geology, and published a report (April 30, 1999) entitled "Chemistry of Surface Waters in the Barnes Aquifer, Hampshire and Hampden Counties". The results of this study will be used as the baseline data for future water quality analyses. Smith College uses the data from the study in the classroom to run modeling exercises.

Contingency Planning

Each of BAPAC's member communities has its own contingency plans regarding water quality and quantity. As defined by their independent emergency management plans, the local fire departments are responsible for dealing with spills and contamination events in the aquifer areas. Each community's local emergency planning committee reviews spill response plans and conducts drills for different emergency situations. The Emergency Management Coordinator of each community is also involved in any emergency situation. The four communities also have contingency plans for emergency water supplies, either via a local reservoir or by temporary connections to a neighboring municipality's water system.

Measuring Program Effectiveness

There are signs the education and outreach efforts of BAPAC are beginning to make a difference. For example, in the Spring of 2001, The City of Easthampton was debating reducing the R40 zoning lot size requirements over a portion of the aquifer. The proposed change would have created the possibility of an additional 20 to 50 new homes being built within the recharge area of the aquifer. In an attempt to educate the public about the aquifer so that people were able to make a more informed decision at the polls in April, BAPAC co-sponsored a public meeting with the Easthampton Aquifer Committee. BAPAC member Professor Bob Newton gave a multimedia presentation about the structure and function of the aquifer, how it was formed, and its location. The potential effects of smaller residential lot sizes were never discussed. On April 3rd, the citizens of Easthampton voted to maintain the R40 zoning.

BAPAC received the Massachusetts Department of Environmental Protection's 2000 Source Protection Award in recognition of their outstanding performance and achievement to protect drinking water quality by protecting the source. BAPAC was one of two organizations in the state to receive the award.

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